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FROM: PROI (TI) (STINFO) 13 Nov 2000

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-AB-2000-219**
Gulczinski, F.S., "Powersail High Power Propulsion System Design Study"

37th AIAA/ASME/SAE/ASEE Joint Propulsion Conference (Statement A)
(Salt Lake City, UT, 8-11 Jul 2001) (Deadline for Abstract: 08 Nov 00)

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PHILIP A. KESSEL Date
Technical Advisor
Propulsion Science and Advanced Concepts Division

Powersail High Power Propulsion System Design Study

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A desire by the United States Air Force to exploit the space environment has led to a need for increased on-orbit electrical power availability. To enable this, the Air Force Research Laboratory Space Vehicles Directorate (AFRL/VS) is developing Powersail, a two-phased program to demonstrate high power (100 kW to 1 MW) capability in space using a deployable, flexible solar array connected to the host spacecraft using a slack umbilical. The first phase will be a proof-of-concept demonstration at ~50 kW, followed by the second phase, an operational system at full power. In support of this program, the AFRL Propulsion Directorate's Spacecraft Propulsion Branch (AFRL/PRS) at Edwards AFB has commissioned a design study of the Powersail High Power Propulsion System. The purpose of this study, the results of which are summarized in this paper, is to perform mission and design trades to identify potential full-power applications (both near-Earth and interplanetary) and the corresponding propulsion system requirements and design. The design study shall further identify a suitable low power demonstration flight that maximizes risk reduction for the fully operational system. This propulsion system is expected to be threefold: (1) primary propulsion for moving the entire vehicle, (2) a propulsion unit that maintains the solar array position relative to the host spacecraft, and (3) control propulsion for maintaining proper orientation for the flexible solar array.

change ; semicolon to colon.

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